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ECHINOCACTUS WISLIZENI ENGEL. AND ECHINOCACTUS LECONTEI ENGEL.

By R. E. Kunze

In regard to these two species, there is a diversity of opinion as to their position as distinct species. Dr. George Engelmann considered them as distinct from each other. The late Dr. K. Schumann united these species and made one a variety of the other. Dr. Schumann had never observed adult plants of either of them, and could not have known how unlike the spines of each are, when the plants are fully matured. Dr. James W. Toumey,* formerly professor of botany in the University of Arizona, at Tucson, also held that these plants were two distinct species.

I have collected all of my plants of *Echinocactus Wislizeni* in the river bottoms of Rio Gila, Rio Salado and the Agua Fria, which last named stream is confluent with the Rio Gila 18 miles from Phoenix. The Rio Salado empties its waters into the Rio Gila 15 miles from Phoenix. *Echinocactus Wislizeni* is usually found very near to the bottom-lands of these rivers, and on the tableland when this is of a sandy and loamy character, as it is for a few miles beyond. *Echinocactus Lecontei* is generally met with in the foothills of our mountains and when growing on tablelands it prefers the rockiest situations, among boulders of granite or a calcareous formation. Sometimes it is found in very sandy arroyos, or water courses of the tableland, and in such cases the form is that of an obovate plant, while the cylindrical form always occupies the sides of our foothills and mountains. I have collected plants of *Lecontei* of two meters in

* Garden and Forest 8: 154. 1895.

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length and weighing 350 pounds, equivalent to 175 kilo. All the mature plants of *Lecontei* have invariably a *curved central spine.*

Echinocactus Wislizeni, of which I have collected specimens two and a quarter meters in length, also average 175 kilo. in weight. But the form is much more obovate or subglobose and therefore of greater diameter, on which account it is called barrel cactus. Cylindrical plants of this species do not exist. Smaller sizes are quite spherical.

The central spine of a mature plane of *Wislizeni* is always very much *hooked*, hence this species is known as the fishhook cactus. The flower of *Lecontei* is yellow, of the shade known as Indian yellow. The flowers of all the many hundreds of *Wislizeni* I have observed during the past dozen years in the vicinity of Phoenix, were always of a rich purple color, and also in all specimens met with in the bottom lands of the Rio Santa Cruz, near Tucson, and the Rio Rillito, near Pantano, Arizona, the flowers were purple. Yet Prof. John M. Coulter, in The Botany of Western Texas, says the flower of *Wislizeni* is *yellow*, and gives locality on the upper Rio Grande, from El Paso upwards. Dr. Bigelow collected *Wislizeni* near the Rio Colorado in Arizona nearly fifty years ago, but made no mention of the flowers.

I am now in a position to settle the difference of opinion in regard to these two species. Mr. E. O. Wooton, for twenty years botanist of the experiment station of the agricultural college, Mesilla Park, New Mexico, visited me on the 29th of July, 1911, for the purpose of studying the many species of my cactus farm. Mr. Wooton had previously paid much attention to the succulents of New Mexico. He therefore was much astonished to see one of my plants of *Wislizeni* with a purple flower, and also noted the difference of the size of spines between my plants and those of New Mexico. Now Mesilla Park is located in Doña Ana County, the type locality of *Wislizeni*, where all flowers of this species are yellow or straw-colored.

Fortunately we found a plant of *Lecontei* in one of the beds with a belated flower having yellow petals, anthers and stamens, all others being withered, and Mr. Wooton remarked that it was

the counterpart of the color of the flower of *Wislizeni* in Doña Ana County. The size of the plants of *Wislizeni* in New Mexico, Mr. Wooton told me, were only half the size of those in my garden, and I happened to have plants on hand from 30 cm. up to $1\frac{1}{2}$ meters in height.

On the 31st of July, I discovered another flower on the same plant of *Wislizeni*, which was tinted a whitish yellow, and it made me think it might be a hybrid. It is a rare occurrence in the vicinity of Phoenix to find a plant of *Wislizeni* among hundreds of *Lecontei*, and *vice versa*. The earlier flowers of this plant had petals of a similar tint, but the one last observed, on July 31, had petals decidedly yellower on both sides. Mr. Wooton advised me to make a new species of *Wislizeni*, which had *purple* flowers. After due consideration, I concluded to determine it as *Echinocactus Wislizeni*, var. **Phoeniceus,** so as to avoid errors in the future regarding these two species.

Where the zone of the occurrence of these two species is of a near approach, it is with difficulty that we can separate young plants, without flowers, one from the other, because the central spine of *Lecontei* is frequently as much hooked as in young specimens of *Wislizeni*.

It is a rare occurrence for a *Wislizeni* to sprout unless the plant has been injured, whereas in *Lecontei*, it is frequently noticed on normal plants. Taken in consideration that *Lecontei* blooms fully six to seven weeks earlier than *Wislizeni*, a fact also observed by Prof. Toumey, why should not these two plants be considered as distinct species, as first suggested by Dr. George Engelmann, in the botany of the Mexican Boundary Report. It cannot be otherwise.

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FOSSIL FLOWERS AND FRUITS.—III*

BY T. D. A. COCKERELL

Sambucus Ellisiae sp. nov.

Flower 5.75 mm. in diameter; corolla with five triangular lobes, a fraction over 1 mm. long, their sides nearly straight and their

* Fossil Flowers and Fruits, I. and II., appeared in TORREYA 11: 234 and 12: 32.